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09/913,990	08/21/2001	Hermann-Jens Womelsdorf	MO-6508/LEA33.306	8025

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EXAMINER

METZMAIER, DANIEL S

ART UNIT	PAPER NUMBER
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1712

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DATE MAILED: 12/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/913,990

Applicant(s)

WOMELSDORF ET AL.

Examiner

Daniel S. Metzmaier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2000 and 25 June 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-10 and 12 is/are rejected.
- 7) ☒ Claim(s) 5-7, 11, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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### **DETAILED ACTION**

Claims 1-14 are pending. The Priority Papers filed March 20, 2000 have been entered as Paper No. 4. The Information Disclosure Statement filed June 25, 2002 has been entered as Paper No. 5.

#### ***Priority***

1. Receipt is acknowledged of papers received in this national stage application from the International Bureau (PCT Rule 17.2(a)), submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Information Disclosure Statement***

2. Only one sheet of the Form PTO-1449 was present at the time of examination. The additional reference provided is cited on the Form PTO-892 corresponding to the Spanhel et al reference.

#### ***Drawings***

3. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

#### ***Specification***

4. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

5. The disclosure is objected to because of the following informalities: the disclosure fails to provide a brief description of the drawings.

Appropriate correction is required.

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6. The specification does not include headings which are standard in U.S. Patents: Background of the Invention, Field of the Invention, Description of the Related Art, Summary of the Invention, Abstract of the Disclosure.

Appropriate correction is requested.

### ***Claim Objections***

7. Claims 5-7, 11, and 13-14<sup>1</sup> are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only and/or cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 5-7, 11, and 13-14 have not been further treated on the merits.

8. Claims 1-4, 8-10 and 12 are objected to because of the following informalities: the claims appear to be a literal translation of the foreign application and employs transitional phrases such as "characterized in that", which does not conform the US Patent Practice. It is suggested applicants employ transitional phrases that have been litigated and have an accepted meaning such as "comprising", "consisting essentially of", and "consisting of". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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<sup>1</sup> Claims 13 and 14 are drafted in improper format as "use" claims and would be subject to alternative rejections under 35 USC 101 and/or 112, second paragraph. To the extent said claims are corrected to place said claims in proper form, said claims may be subject the restriction practice.

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10. Claims 1-4, 8-10 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 is confusing because a gel is conventionally accepted as having a solid continuous phase and a liquid or liquid and solid discontinuous phase. It is unclear if applicants intend ZnO gel particles since the compositions does not define a continuous phase by the recitation of the ZnO particle size. Since gel is not specifically defined in the specification, it takes the plain meaning in the art.

All the claims appear to be a literal translation of the foreign applications. The language of the claims renders the claims indefinite because they do not employ the active voice, i.e., claim 8 sets forth ZnO sols "obtainable". Said language does not positively recite the sols claimed or whether the claimed scope reads on any sol, the sols "obtainable" as claimed are but one such sol. Said language renders applicants' intent for the scope of claim 1 unclear due to the term "redispersible". It is unclear whether gels or sols are claimed. See above comments regarding gels.

In claim 2, the phrase "in that they" renders the claim indefinite because it is unclear whether "they" refers to the gel or the particles. The term foreign ions has not been specifically defined in the specification or the claims. It is noted the specification sets forth preferred foreign ions.

In claims 3, 4 and 12, "the precipitate" lack antecedent basis.

#### ***Claims interpretation***

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11. Claims 1-2 are directed to a ZnO gels. Claims 3-4 are directed to methods of making said gels. Claims 8-10 are directed to zinc oxide sols. Claim 12 is directed too methods of making said sols. Foreign ions has been interpreted to include foreign metal ions and silicates. Gel has been interpreted to read on gel particles, which may have particle flocs of particles.

Several of the claims are drafted in product by process format. Said claims are examined based on the product. The process limitations are given patentable weight only to the extent said steps impart structure to the product produced. Said steps may be given little or no weight for the product claims. See MPEP 2113.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-4, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Hilgendorff et al, "From ZnO Colloids to Nanocrystalline Highly Conductive Films", *J. Electrochem. Soc.*, Vol. 145, No. 10, Oct 1998, pages 3632-3637. Hilgendorff et al (abstract and Experimental) discloses the formation of a suspension of ZnO particles having a particle size of 3 to 6 nanometers in propanol. The propanol and/or methanol solvent contains at least minor portions of water as well as the water produced during hydrolysis/condensation. The method employs tetramethyl ammonium hydroxide in methanol as base catalyst.

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The Hilgendorff et al compositions are disclosed as having 50-70% by weight solids concentrations. At said concentration said zinc oxide colloid would have inherently contained flocs as claimed and reads on the claimed gel compositions and methods of making said gels.

Hilgendorff et al discloses the addition of stabilizing agents comprising aluminum or indium alkoxides in a concentration of from 0.5 to 6 atom<sup>2</sup> %. Since Hilgendorff et al discloses the formation of the gels and sols from Zn (Ac)<sub>2</sub>, alcohol and tetramethyl ammonium hydroxide; the only foreign ions as set forth would be the aluminum and indium ions. Said ions are disclosed in the concentrations defined in claim 2.

Claims 8 and 10 are included herein since the compositions would have inherently been the same as those claimed as a dispersion of 3-6 nanometer gel particles.

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilgendorff et al, "From ZnO Colloids to Nanocrystalline Highly Conductive Films". Hilgendorff et al discloses compositions as characterized in the above rejection. Said characterization is incorporated herein by reference.

To the extent the Hilgendorff et al compositions differ from the claims in the characterization of their gel state, the Hilgendorff et al compositions are characterized in the prior art as having a high concentration of the zinc oxide having high viscosity. Said compositions are diluted and redispersed upon surface treatment

It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to dilute and redisperse 3M compositions at the coating concentration such as 2M set forth in the results for the advantage of varying the coating thickness and concentrations.

17. Claims 8-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilgendorff et al, "From ZnO Colloids to Nanocrystalline Highly Conductive Films", as applied to claims 1-4 above, and further in view of Krug et al, US 5,716,679, and Akhtar, US 5,089,248. Hilgendorff et al discloses compositions as characterized in the above anticipation rejection. Said characterization is incorporated herein by reference.

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<sup>2</sup> Atom % is interpreted here to be synonymous with molar %.



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Hilgendorff et al differs from the claims in the redispersion of the materials in a sol form and the use of dichloromethane and/or chloroform.

Krug et al (example 7) discloses zinc oxide sols having a 3 nanometer particle size, which are then incorporated in coating compositions. Krug et al (column 5, lines 5-9) discloses the use of solvents as optional in the nanoparticle formation including polar and nonpolar solvents. Krug et al (column 3, lines 5-7) discloses when mixing the sol with a polymer for certain applications, solvents including such as alcohols ketones and esters may be employed.

Akhtar (column 1, lines 8 et seq) teaches metal oxide use as transparent electrical conductors and electrochromic applications. Akhtar (column 2, lines 37 et seq) teaches the deposition of zinc oxide optionally with indium or aluminum at molar concentrations of 1 to 4 molar % based on the zinc. Akhtar (discloses the use of dichloromethane as a suitable solvent for deposition.

These references are combinable because they teach zinc oxides optionally doped with indium or aluminum at molar concentrations of 1 to 4 molar % based on the zinc for electrical conductive applications and nanosized zinc oxide particle sols. It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to redisperse the Hilgendorff et al compositions in conventional coating solvents taught in the Akhtar reference.

### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Haase et al, "Photochemistry and radiation Chemistry of

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Colloidal Semiconductors. 23. Electron Storage on ZnO Particles and Size

Quatization". Haase et al is considered cumulative to the Hilgendorff et al reference.

Takeda et al further (column 53, lines 9-13) teaches the formation of ZnO particles having average of 1-100, preferably 1-50 nm, which overlaps the claimed  $\leq 15$  nm.

Said sols may be formulated (column 64, line 59 to column 68, line 21) for a number of utilities and teach a number of solvents for said utility applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (703) 308-0451. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Dawson can be reached on (703) 308-2340. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



**Daniel S. Metzmaier**  
**Primary Examiner**  
**Art Unit 1712**

DSM  
December 13, 2002